

Maine Solar Energy Rebate Program

2006 Annual Report



December 1, 2006

Submitted By:

Maine State Energy Program
Energy Programs Division
Maine Public Utilities Commission
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Introduction

The Maine Public Utilities Commission (MPUC) is pleased to present the first Maine Solar Energy Rebate Program 2006 Annual Report for the time period July 1, 2005-June 30, 2006.

The two primary goals of the program are to:

- 1) Increase the use of solar photovoltaic, solar hot water, and solar air systems by Maine residents; and
- 2) Promote the development of trained and certified renewable energy installers throughout the State of Maine.

The Maine Solar Energy Rebate Program was established on June 29, 2005 as part of Governor Baldacci's Solar Initiative and enacted into law as "An Act To Encourage the Use of Solar Energy" under 35-A MRSA §3211-B.¹ The rebate program is administered by the MPUC's Maine State Energy Program and implemented under the Chapter 930 Solar Energy Rebate Program Rule.² The program provides rebates for the installation of solar photovoltaic (PV), solar hot water, and solar air systems for Maine residents. PV systems qualify for a rebate of \$3/watt on the first 2,000 watts of installed capacity, and \$1/watt for the next 1,000 watts, for a potential maximum incentive payment of \$7,000. Solar hot water and solar air systems, (both are considered solar thermal) qualify for a rebate of 25% of total installed cost or \$1,250, whichever is less.

The rebate program is funded through a system benefit charge which is applied to all electricity consumers in the State of Maine and administered by the MPUC's Energy Programs Division. Annual funding for the Maine Solar Rebate program is capped at \$500,000 per year through December 31, 2008. Overall, the legislation authorizes the expenditure of \$1.5 million for the incentive program through the statutory repeal date of December 31, 2008. The legislation requires 25% or \$375,000 of the total funding be allocated to PV systems and 75% or \$1,125,000 allocated for solar thermal systems.

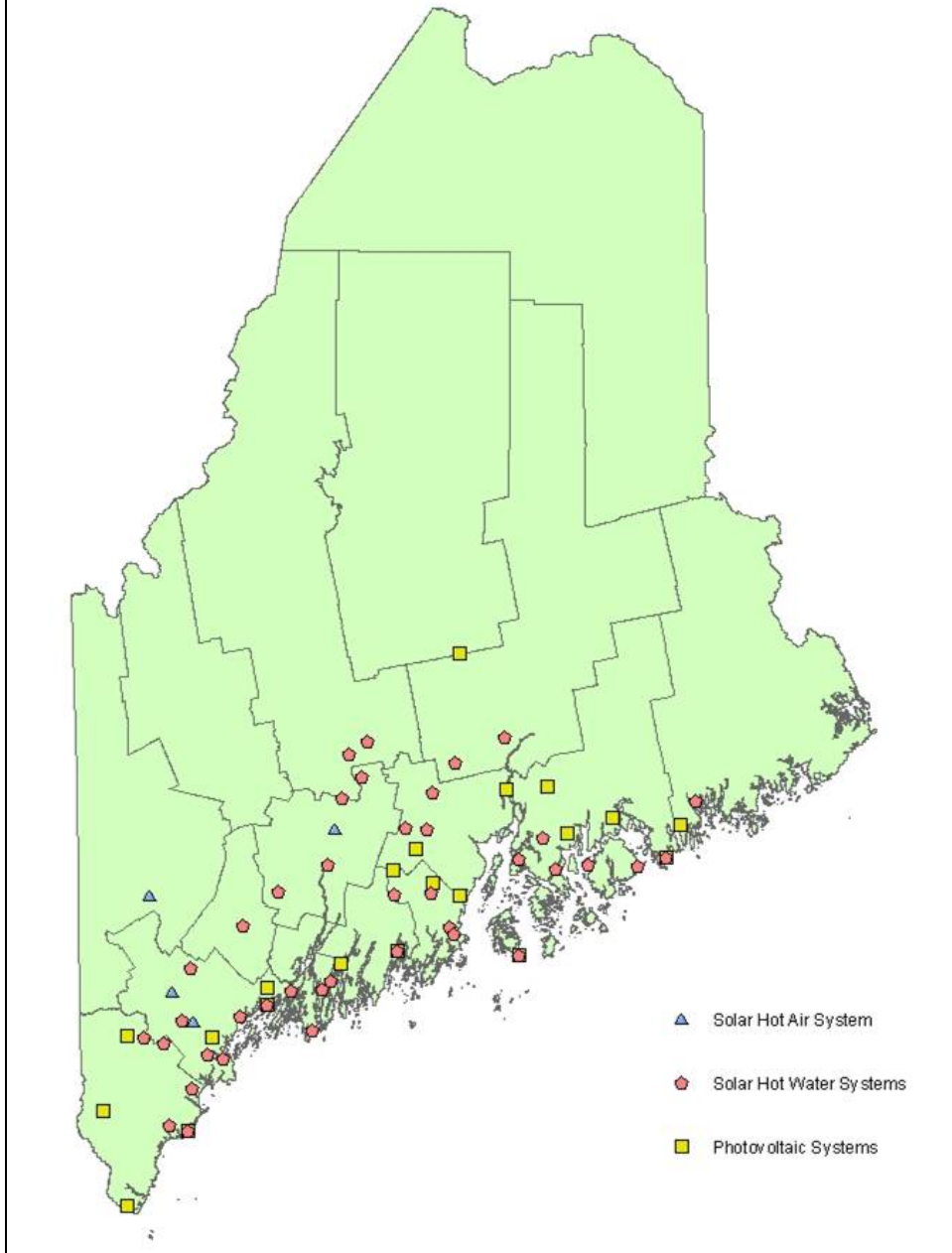
2006 Accomplishments:

- Program designed and implemented
- 69 systems installed
- 100% of PV funding fully reserved
- 66 Solar thermal installers certified by the program
- 18 PV installers received training by Kennebec Valley Community College
- 5 PV installers certified by North American Board of Certified Energy Practitioners (NABCEP)

¹ Pursuant to Revisor's Report 2005, Chapter 1, Section 17, §3211-B was re-allocated to 35-A MRSA §3211-C.

² http://www.maine.gov/mpuc/doing_business/rules/part_9/chap_930.htm

Maine State Energy Program Solar Rebate Program



(2006 Maine Solar Rebate Program installations.)

Financial Report

As detailed in Table 1, as of June 30, 2006, the program paid a total of \$187,459 in rebates for the installation of 69 systems of which, 43 systems (62%) were solar hot water, 22 systems (32%) were PV and 4 systems (6%) were solar air. The program paid out or encumbered through reservations 31% or \$459,654 of total rebate funding through December 31, 2008. This indicates that the program is on track to allocate all of the available funds by December 31, 2008.³

Table 1: Maine Solar Rebate Program Details Through 6/30/06

System Type	Total Funding Through 12/31/08	Reserved as of 6/30/06	Paid as of 6/30/06	Total Reserved and Paid as of 6/30/06	Total Systems Installed	Rebates Available as of 6/30/06 Through 12/31/08
Solar Photovoltaic (PV)	\$375,000	\$248,948	\$132,583	\$381,531	22	\$0
Solar Hot Water	\$1,125,000	\$16,250	\$53,056	\$69,306	43	\$1,064,491
Solar Air		\$6,977	\$1,820	\$8,797	4	
Total	\$1,500,000	\$272,175	\$187,459	\$459,634	69	\$1,064,491

The program experienced a tremendous demand for PV rebates resulting in the full subscription of available rebates through December 31, 2008. Of the \$375,000 allocated for PV systems, 35% or \$132,583 of available PV funds were paid out, with the remaining 65% or \$248,948 fully reserved. Therefore, the program is no longer accepting applications for PV rebates.⁴

Of the \$1,125,000 allocated for solar thermal systems, 5% or \$54,876 were paid out for solar hot water and solar air combined, and an additional 2% or \$23,227 is reserved. All together, 7% or \$78,103 of solar thermal funding is either paid out or encumbered through reservations as of June 30, 2006. This leaves a remaining unreserved balance of \$1,064,491 through December 31, 2008. As will be discussed later in this report, the program recognizes that subscription to the solar thermal portion of the incentive program is low and steps are planned to increase participation.

Energy Savings

As detailed in Table 2, the 69 installations completed during the first year of the rebate program off-set consumption of electricity and fossil fuels by conventional systems. Installed PV systems are estimated to save 76.2 MWh annually with lifetime savings of 1,524 MWh. Installed solar hot water systems are estimated to save annually 4,020 gallons of fuel oil, 3,141 gallons of propane, and 33.2 MWh of electric hot water

³ Given that all PV funds are allocated, the program will focus on marketing the remaining rebates for solar thermal system through December 31, 2008.

⁴ The PV program is actually slightly oversubscribed at the moment and will be adjusted downward as reservation applications drop out over time.

consumption. Lifetime savings for solar hot water systems are estimated to save 80,406 gallons of fuel oil, 62,826 gallons of propane and 663.2 MWh of electric hot water consumption. All together the annual carbon dioxide (CO₂) savings for all of the systems is 123.1 metric tons, with projected lifetime savings of 2,463 metric tons.⁵

Table 2: Maine Solar Rebate Program 2006 Combined Savings

Savings by System and Fuel Type Displaced	Number of Systems	Annual Savings	Lifetime Savings	Annual CO₂ Savings (Metric Tons)	Lifetime CO₂ Savings (Metric Tons)
Solar Photovoltaic (PV) (MWh)	22	76.2	1524.0	35.5	709.9
Solar Hot Water (Gallons of Oil Savings)	22	4020	80,406	47.5	949.4
Solar Hot Water (Gallons of Propane Savings)	16	3141	62,826	18.1	361.1
Solar Hot Water (MWh Savings)	5	33.2	663.2	15.4	308.9
Solar Air (Gallons of Oil Savings)	4	566	11321	6.7	133.7
TOTAL	69	n/a	n/a	123.1	2463.0

Photovoltaic Update

In 2006, 22 PV systems were installed with the support of the rebate program. All systems are grid-tied. As detailed in Table 3, the average system size was 2.74 kW, with an average total installed cost of labor and materials of \$23,889. The average rebate was \$6,027, which covered approximately 25% of the system installed cost. In terms of customer cost per watt, the average cost was \$8.91 per watt before the rebate, and \$6.35 per watt after the rebate. In terms of estimated kWh production, the average system is reported to produce 3,463 kWh per year.⁶

Table 3: Solar Photovoltaic (PV) Installation Details as of 6/30/06

System Number (n)	22
Average System Size (kW)	2.74
Average Total Cost	\$23,889
Average Rebate	\$6,027
Average Customer Cost After Rebate	\$17,863
Percent of System Cost Paid by Rebate	25%
Installed Customer Cost/Watt Before Rebate	\$8.91
Installed Customer Cost/Watt After Rebate	\$6.35

⁵ We conservatively estimate all PV and thermal systems have a 20 year lifetime.

⁶ The average Maine residential customer consumes 6,817 kWh per year. Energy Information Administration, 2004. <http://www.eia.doe.gov/cneaf/electricity/esr/table12.xl>



(Solar electric system (3.7 kW), Bryant Pond, ME. Installed by Penobscot Solar)

A total of seven different companies installed systems in 2006, of which, one company accounted for 50% of all installations. The next most active company installed 9% of systems. In terms of market development, a total of 18 PV system installers were trained by Kennebec Valley Community College, and 5 certified by the North American Board of Certified Energy Practitioners (NABCEP). As of January 1, 2007, only NABCEP certified installers that are master electricians, or working in partnership with a master electrician, are allowed to participate in the rebate program.

Solar Hot Water Update

In 2006, 43 solar hot water systems were installed with the support of the rebate program. As detailed in Table 4, the average system production is estimated at 16.6 MMBtu per year with an average total installed cost of \$8,024. The average rebate was \$1,234, which covered approximately 15% of the system installed cost.

Table 4: Solar Hot Water Installation Details as of 6/30/06	
System Number (n)	43
Average System Size (MMBtu/Yr)	16.6
Average Total Cost	\$8,024
Average Rebate	\$1,234
Average Customer Cost After Rebate	\$6,790
Percent of System Cost Paid by Rebate	15%



(Solar electric system (2.1 kW) (left) and solar hot water system (right), Brunswick, ME. Installed by Liberty Energy Works LLC.)

Nine different companies installed solar hot water systems in 2006, of which, one company accounted for 53% of installations, the next highest represented 26% of total installations. In terms of market development, a total of 66 individuals are certified as qualified solar thermal installers for participation in the rebate program, however actual program participation at the moment is limited to a handful of companies. Installations must be completed by a licensed plumber who is also a certified solar thermal installer or working in conjunction with a certified solar thermal installer. In 2006, the program sponsored three training classes in Augusta, Brewer, and Portland and trained a total of 107 individuals, of which 66 took the necessary additional steps to be officially certified by the program as qualified solar thermal installers.

Solar Air Update

In 2006, 4 solar air systems were installed with the support of the rebate program. Solar air systems heat air through the concentrated capture of solar radiation and distribute the heated air through the residence by a fan. As detailed in Table 5, the average system production is estimated at 10.2 MMBtu per year with an average total installed cost of \$1,820.⁷ The average rebate was \$455, which covered approximately 25% of the system installed cost.

⁷ We estimate the average Maine residential home consumes approximately 100 MMBtu per year for space heating.

Table 5: Solar Air Installation Details as of 6/30/06

System Number (n)	4
Average System Size (MMBtu/Yr)	10.2
Average Total Cost	\$1,820
Average Rebate	\$455
Average Customer Cost After Rebate	\$1,365
Percent of System Cost Paid by Rebate	25%



(Solar air system, Cumberland, ME. Installed by Assured Solar Energy.)

Four different companies each installed one solar air system in 2006.

Conclusion

On November 14, 2006, the program held a solar stakeholder meeting in Augusta, ME with approximately 20 installers and vendors of solar systems. This meeting provided a venue for the solar stakeholder community to provide input on program design and implementation of the rebate program. As a result of this meeting and our own observations, our program efforts for 2007 will focus first on increased marketing of the remaining rebates for solar thermal systems and modifications to the application forms. The remainder of this report presents three appendices detailing the completed installations for PV, solar hot water and solar air systems.

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APPENDIX A

Solar Electric System Installation Details through 6/30/06						
Town	Installed Watts	Total Installed Cost	Rebate	Participant Cost Net of Rebate	Installed cost/Watt Before Rebate	Installed cost/Watt After Rebate
BASS HARBOR	2100	\$19,350	\$6,100	\$13,250	\$9.21	\$6.31
BLUE HILL	2100	\$22,715	\$6,100	\$16,615	\$10.82	\$7.91
BLUE HILL	3690	\$24,192	\$7,000	\$17,192	\$6.56	\$4.66
BRUNSWICK	2100	\$23,200	\$6,100	\$17,100	\$11.05	\$8.14
BUCKSPORT	3690	\$40,392	\$7,000	\$33,392	\$10.95	\$9.05
CAMDEN	10920	\$87,273	\$7,000	\$80,273	\$7.99	\$7.35
CUMBERLAND CENTER	2250	\$19,800	\$6,250	\$13,550	\$8.80	\$6.02
FREEPORT	3150	\$23,400	\$7,000	\$16,400	\$7.43	\$5.21
GOULDSBORO	2100	\$19,400	\$6,100	\$13,300	\$9.24	\$6.33
KENNEBUNKPORT	480	\$5,100	\$1,440	\$3,660	\$10.63	\$7.63
KITTERY	2280	\$22,000	\$6,280	\$15,720	\$9.65	\$6.89
LAMOINE	2310	\$18,325	\$6,310	\$12,015	\$7.93	\$5.20
LEBANON	1980	\$12,669	\$5,940	\$6,729	\$6.40	\$3.40
LIMINGTON	2280	\$20,200	\$6,280	\$13,920	\$8.86	\$6.11
MONTVILLE	2100	\$15,300	\$6,100	\$9,200	\$7.29	\$4.38
NORTH VASSALBORO	480	\$4,150	\$1,440	\$2,710	\$8.65	\$5.65
ORLAND	2100	\$19,000	\$6,100	\$12,900	\$9.05	\$6.14
PORTLAND	3060	\$33,244	\$7,000	\$26,244	\$10.86	\$8.58
STEUBEN	3000	\$28,140	\$7,000	\$21,140	\$9.38	\$7.05
TENANTS HARBOR	3060	\$26,178	\$7,000	\$19,178	\$8.56	\$6.27
WASHINGTON	2943	\$23,013	\$6,943	\$16,070	\$7.82	\$5.46
WEST BOWDOIN	2100	\$18,525	\$6,100	\$12,425	\$8.82	\$5.92
AVERAGE	2740	\$23,889	\$6,027	\$17,863	\$8.91	\$6.35
TOTAL	60273	\$525,565	\$132,583	\$392,982	n/a	n/a

Appendix B: Solar Hot Water System Installation Details through 6/30/06				
Town	Estimated Output (MMBtu/yr)	Total Installed Cost	Rebate	Participant Cost Net of Rebate
APPLETON	6.1	\$10,975	\$1,250	\$9,725
ARROWSIC	30.0	\$6,400	\$1,250	\$5,150
AUGUSTA	21.6	\$5,711	\$1,250	\$4,461
BANGOR	9.3	\$7,600	\$1,250	\$6,350
BAR HARBOR	9.3	\$4,200	\$1,050	\$3,150
BLUE HILL	6.9	\$5,054	\$1,250	\$3,804
BROOKSVILLE	28.9	\$10,420	\$1,250	\$9,170
BROOKSVILLE	22.0	\$14,828	\$1,250	\$13,578
BROOKSVILLE	8.8	\$15,400	\$1,250	\$14,150
BROOKSVILLE	8.8	\$8,400	\$1,250	\$7,150
BRUNSWICK	16.0	\$8,000	\$1,250	\$6,750
CANAAN	18.6	\$5,600	\$1,250	\$4,350
CLINTON	18.6	\$6,300	\$1,250	\$5,050
CUMBERLAND FORESIDE	70.0	\$22,682	\$1,250	\$21,432
DIXMONT	7.9	\$4,945	\$1,250	\$3,695
FREEDOM	9.3	\$6,800	\$1,250	\$5,550
FREEPORT	6.1	\$8,250	\$1,250	\$7,000
GORHAM	19.7	\$5,385	\$1,250	\$4,135
GOULDSBORO	10.5	\$5,666	\$1,250	\$4,416
HOPE	55.5	\$16,225	\$1,250	\$14,975
HOPE	28.0	\$6,860	\$1,250	\$5,610
KENNEBUNK	10.0	\$6,623	\$1,250	\$5,373
KENNEBUNKPORT	19.7	\$9,471	\$1,250	\$8,221
KENNEBUNKPORT	19.7	\$9,018	\$1,250	\$7,768
LEWISTON	9.3	\$6,500	\$1,250	\$5,250
LIMINGTON	8.0	\$5,734	\$1,250	\$4,484
MONTVILLE	9.3	\$6,500	\$1,250	\$5,250
MOUNT DESERT	6.1	\$8,700	\$1,250	\$7,450
OLD ORCHARD BEACH	8.0	\$6,452	\$1,250	\$5,202
PORTLAND	20.0	\$6,463	\$1,250	\$5,213
RAYMOND	12.9	\$4,226	\$1,056	\$3,169
SARGENTVILLE	6.0	\$3,800	\$950	\$2,850
SKOWHEGAN	18.6	\$6,850	\$1,250	\$5,600
SOUTH HARPSWELL	20.0	\$11,615	\$1,250	\$10,365
SOUTH PORTLAND	8.0	\$6,534	\$1,250	\$5,284
STEUBEN	20.8	\$9,600	\$1,250	\$8,350
THORNDIKE	9.3	\$6,500	\$1,250	\$5,250
VINALHAVEN	6.1	\$8,200	\$1,250	\$6,950
WALDOBORO	21.4	\$6,666	\$1,250	\$5,416
WASHINGTON	6.9	\$5,275	\$1,250	\$4,025
WEST BUXTON	22.0	\$6,666	\$1,250	\$5,416
WOOLWICH	9.3	\$6,000	\$1,250	\$4,750
YARMOUTH	32.0	\$11,949	\$1,250	\$10,699
AVERAGE	16.6	\$8,024	\$1,234	\$6,790
TOTAL	715.3	\$345,043	\$53,056	\$291,986

APPENDIX C

Solar Air System Installation Details through 6/30/06				
Town	Estimated Output (MMBtu/yr)	Overall Total Gross System Installed Cost as Reported on Final Invoice	Rebate	Participant Cost Net of Rebate
KITTERY POINT	9	\$1,649	\$412	\$1,237
RAYMOND	22.8	\$2,670	\$668	\$2,003
SIDNEY	3.8	\$1,480	\$370	\$1,110
WINDHAM	5	\$1,480	\$370	\$1,110
AVERAGE	10.15	\$1,820	\$455	\$1,365
TOTAL	40.6	\$7,279	\$1,820	\$5,459